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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,039	04/14/2004	Weisheng Lei	50001/100:1	7398
3528	7590	05/18/2005	EXAMINER	
STOEL RIVES LLP - PDX 900 SW FIFTH AVENUE SUITE 2600 PORTLAND, OR 97204			EVANS, GEOFFREY S	
			ART UNIT	PAPER NUMBER
			1725	

DATE MAILED: 05/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/825,039

Applicant(s)

LEI ET AL.

Examiner

Geoffrey S. Evans

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In Claim 1 the relationship between "a path" on line 7 and "a path" on line 16 is unclear. Are they the same path or different paths? In claim 18 it is unclear how a "generally circular" (as opposed to spiral) path can have a distance from a starting point that constantly changes (as recited in claim 1).

2. Claims 1-18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no disclosure in the originally filed application of "at a first starting point located within the first spot area and moving the first laser output along a path whose distance from the first starting point constantly changes" and "at a second start point located within the second spot area and moving the second laser output along a path whose distance from the first starting point constantly changes". Regarding claim 15, there is no support in the original specification that "the first starting point and the second starting point are in the same spatial location on the target material". In claim 16, there is no support in the original specification that "the first starting point and the second starting point are in different spatial locations on the target material". Paragraph 33 of the instant application only states that the vias are typically produced by "trepanning, concentric circle processing,

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or spiral processing " There is no disclosure of a "first starting point" or a "second starting point".

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-6,8-12,14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zahaykevich in WO 86/02301 in view of Noddin in U.S. Patent No. 6,103,992 and Abeln et al. in the article "High Precision Machining with Solid-State Lasers". Zahaykevich discloses laser drilling a pilot hole into a multilayered electronic circuit board (e.g. see page 3., lines 18-24 and page 6,lines 12-16), followed by generating a second laser output having sufficient energy density over a second spatial spot size to remove target material within a second spot area defined by the second

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spatial size (e.g. see abstract and page 43,line 8 to page 44,line 16) to create a through hole of the desired size and shape. However Zahaykevich uses percussion drilling to form the hole. Noddin teaches using trepanning in a first pattern at a first energy density, followed by trepanning in a second pattern at a second energy density to achieve drilled holes have desirable characteristics, i.e. holes with low entrance and exit variances (see column 3,lines 1-11), using a laser with a wavelength of 355 nm (see column 3,line 57), and using different laser sources (see column 5,lines 43-54). Abeln et al. teaches using a spiral path when machining a hole to increase accuracy (see page 6, column 3, first full paragraph) of the May 2000 issue of "LAMBDA HIGHLIGHTS". It would have been obvious to adapt Zahaykevich in view of Noddin and Abeln to provide this to increase the accuracy of the laser drilled hole.

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zahaykevich in view of Noddin in U.S. Patent No. 6,103,992 and Abeln et al. as applied to claim 1 above, and further in view of Dunskey et al. in U.S. Patent No. 6,433,301. Dunskey et al. teaches laser drilling a hole having a diameter of less than 150 microns (see column 5,lines 45-57) and that it is preferable to use a frequency tripled Nd:YAG laser having a wavelength of 355 nm for forming vias. It would have been obvious to adapt Zahaykevich in view of Noddin, Abeln et al. and Dunskey et al. to provide this to drill holes having a diameter of less than 150 microns (it is clearly desirable in electronics to reduce the size of vias so that circuits are as small as possible).

7. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zahaykevich in view of Noddin in U.S. Patent No. 6,103,992 and Abeln et al. as

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applied to claim 1 above, and further in view of Yung et al. in U.S. Patent No. 6,809,289. Yung et al. teaches using a frequency tripled YAG laser operating at 355nm to drill in both copper conductor and dielectric layers (see column 1, lines 33-35). It would have been obvious to adapt Zahaykevich in view of Noddin, Abeln et al. and Yung et al. to provide this to economize on the number of lasers required to drill holes.

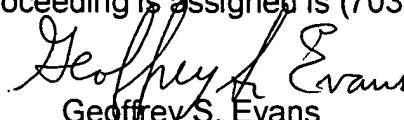
8. Applicant's arguments with respect to claims of record have been considered but are moot in view of the new ground(s) of rejection. Zahaykevich is not being relied upon to disclose a laser beam path during drilling.

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Noddin in U.S. Patent No. 5,841,102 discloses laser drilling a via.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey S Evans whose telephone number is (571)-272-1174. The examiner can normally be reached on Mon-Fri 6:30AM to 4:00 PM, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571)-272-1171. The fax phone number for the organization where this application or proceeding is assigned is (703)-872-9306.

GSE


Geoffrey S. Evans
Primary Examiner
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